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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No. 10/576,311	Applicant(s) MATTHEIJSEN ET AL.
	Examiner THUAN NGUYEN	Art Unit 4145

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 18 April 2006.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-18 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____

5) Notice of Informal Patent Application
 6) Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically the use of *transmitter (Tx₁, Tx₂), receiver (Rx₁, Rx₂)* makes it unclear about the number of transmitters or receivers recited in the claims. In addition, the phrase *the at least first (s'₁) and second (s'₂) simultaneously transmitted signals* in claims 1 and 5 and the phrase *the at least first (s'₁) and second (s'₂) simultaneously received signals* in claims 8 and 16 do not carry a clear meaning.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 7, 8, 9, 11, 14, 17 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhuang (US 2003/0123381 A1).

5. As per claim 1, Zhuang teaches *transmitter (Tx₁, Tx₂) for simultaneously transmitting at least a first (s'₁) and a second (s'₂) signal (Zhuang, figure 2, elements 25 and 26), the first signal (s'₁) being modulated according to a first modulation constellation, the second signal (s'₂) being modulated according to a second modulation constellation (Zhuang, figure 2, elements 23 and 24 show two separate modulators for the two signals), wherein the transmitter is arranged to pre-code at least the first signal (s'₁) through a modification of the first modulation constellation so as to prevent a correlation between the at least first (s'₁) and second (s'₂) simultaneously transmitted signals (Zhuang, figure 2, elements 23 and 24 also show that the first modulation constellation is orthogonal to the second modulation constellation, i.e. modified to have a 90-degree phase shift to prevent correlation with the second signal).*

6. As per claim 2, Zhuang teaches claim 1. Zhuang also teaches *the pre-coding of at least the first signal (s'₁) comprises a rotation of the first modulation constellation through a first angle (Zhuang, figure 2, elements 23 and 24 show that the first modulation constellation is orthogonal to the second modulation constellation, i.e. rotated a 90-degree angle compared to the second modulation constellation).*

7. As per claim 7, Zhuang teaches claim 1. Zhuang also teaches *the first and second modulation constellations are M-ary QAM modulation constellations* (Zhuang, paragraph [0027], line 9, teaches that the first and second modulations can be 16-QAM and so forth).

8. As per claim 8, Zhuang teaches *receiver (Rx₁, Rx₂) for simultaneously receiving at least a first (s'₁) and a second (s'₂) signal from a transmitter (Tx₁, Tx₂)* (Zhuang, figure 8, elements 81 and 82 are receivers that receive the signals simultaneously transmitted in figure 2), *the first received signal (s'₁) being modulated according to a first modulation constellation, the second received signal (s'₂) being modulated according to a second modulation constellation* (Zhuang, figure 2, elements 23 and 24 show two separate modulators for the two signals to be received in figure 8), *in which at least the first received signal (s'₁) is pre-coded through a modification of the first modulation constellation so as to prevent a correlation between the at least first (s'₁) and second (s'₂) simultaneously received signals* (Zhuang, figure 2, elements 23 and 24 also show that, for the signals to be received in figure 8, the first modulation constellation is orthogonal to the second modulation constellation, i.e. modified to have a 90-degree phase shift to prevent correlation with the second signal).

9. As per claim 9, Zhuang teaches claim 8. Zhuang also teaches *the pre-coding of the first (s'₁) received signal comprises a rotation of the first modulation constellation* (Zhuang, figure 2, elements 23 and 24 show that, in the signals to be received in figure

8, the first modulation constellation is orthogonal to the second modulation constellation, i.e. rotated a 90-degree angle compared to the second modulation constellation).

10. As per claim 11, Zhuang teaches claim 8. Zhuang also teaches *the pre-coding further comprises a change of the number of simultaneously received signals (s'1, s'2)* (Zhuang, figure 8 shows the receiver which receives the signals transmitted in figure 3 where the system transmits data from multiple sources 1 to N, and since N is not a fixed number, the number of sources, i.e. the number of simultaneously transmitted signals, can change according to N).

11. As per claim 14, Zhuang teaches claim 8. Zhuang also teaches *the first and second modulation constellations are M-ary QAM modulation constellations* (Zhuang, paragraph [0027], line 9, teaches that the first and second modulations can be 16-QAM and so forth).

12. As per claim 17, Zhuang teaches claim 1. Zhuang also teaches *wireless device comprising a transmitter according to claim 1* (Zhuang, figure 2).

13. As per claim 18, Zhuang teaches claim 1. Zhuang also teaches *telecommunication system comprising a transmitter according to claim 1* (Zhuang, figure 2 shows the transmitting side of a telecommunication system, and figure 8 shows the receiving side of the same telecommunication system).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 3, 4, 5, 10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhuang (US 2003/0123381 A1) and in view of Cudak (US 2005/0289256 A1).

16. As per claim 3, Zhuang teaches claim 1. Zhuang does not teach *the pre-coding of at least the first signal (s₁), comprises a change of the order of the first modulation constellation*. However, Cudak teaches *the pre-coding of at least the first signal (s₁) comprises a change of the order of the first modulation constellation* (Cudak, paragraph [0019], lines 7-13, teaches that the modulation scheme for a data stream is changed to match the signal quality. Specifically, a higher modulation order is used when the signal quality is high, and a lower modulation order is used when the signal quality decreases.) Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement *the pre-coding of at least the first signal (s₁) comprises a change of the order of the first modulation constellation* of Cudak into Zhuang, since Zhuang teaches the modulation of signals (something broad) in general,

and Cudak suggests the beneficial use of changing the modulation order such as to adapt the system to the channel quality for efficient use of the transmission channel in the analogous art of wireless communications.

17. As per claim 4, Zhuang and Cudak teach claim 3. Zhuang also teaches *the pre-coding further comprises a change of the number of simultaneously transmitted signals (s'₁, s'₂)* (Zhuang, figure 3, shows the system transmitting data from multiple sources 1 to N, and since N is not a fixed number, the number of sources, i.e. the number of simultaneously transmitted signals, can change according to N).

18. As per claim 5, Zhuang teaches claim 1. Zhuang does not teach *the transmitter is arranged to pre-code at least the first (s'₁) signal after receipt of a first signal from a receiver (Rx₁, Rx₂) of the at least first (s'₁) and second (s'₂) simultaneously transmitted signals*. However Cudak teaches *the transmitter is arranged to pre-code at least the first (s'₁) signal after receipt of a first signal from a receiver (Rx₁, Rx₂) of the at least first (s'₁) and second (s'₂) simultaneously transmitted signals* (Cudak, figure 4, step 405 teaches that the base station receives a channel quality report message from remote units before determining an appropriate modulation and coding scheme for the transmitted signal in step 409.) Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement *the transmitter is arranged to pre-code at least the first (s'₁) signal after receipt of a first signal from a receiver (Rx₁, Rx₂) of the at least first (s'₁) and second (s'₂) simultaneously transmitted signals* of Cudak into

Zhuang, since Zhuang suggests the modulation of signals (something broad) in general and Cudak suggests the beneficial use of the transmitter receiving information from the remote units regarding channel quality before deciding on the modulation scheme such as to adapt the system correctly to the channel conditions for more efficient operation in the analogous art of wireless communications.

19. As per claim 10, Zhuang teaches claim 8. Zhuang does not teach *the pre-coding of at least the first received signal (s₁), comprises a change of the order of the first modulation constellation*. However, Cudak teaches *the pre-coding of at least the first received signal (s₁), comprises a change of the order of the first modulation constellation* (Cudak, paragraph [0019], lines 7-13, teaches that the modulation scheme for a data stream is changed to match the signal quality. Specifically, a higher modulation order is used when the signal quality is high, and a lower modulation order is used when the signal quality decreases.) Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement *the pre-coding of at least the first received signal (s₁), comprises a change of the order of the first modulation constellation* of Cudak into Zhuang, since Zhuang teaches the modulation of signals (something broad) in general, and Cudak suggests the beneficial use of changing the modulation order such as to adapt the system to the channel quality for efficient use of the transmission channel in the analogous art of wireless communications.

20. As per claim 12, Zhuang teaches claim 8. Zhuang does not teach *the receiver is arranged to transmit a first signal to the transmitter in a response to which the transmitter is arranged to pre-code at least the first (s₁) signal*. However Cudak teaches *the receiver is arranged to transmit a first signal to the transmitter in a response to which the transmitter is arranged to pre-code at least the first (s₁) signal* (Cudak, figure 4, step 405 teaches that the base station receives a channel quality report message from remote units before determining an appropriate modulation and coding scheme for the transmitted signal in step 409.) Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement *the receiver is arranged to transmit a first signal to the transmitter in a response to which the transmitter is arranged to pre-code at least the first (s₁) signal* of Cudak into Zhuang, since Zhuang suggests the modulation of signals (something broad) in general and Cudak suggests the beneficial use of the receiver sending information from the remote units regarding channel quality before the transmitter decides on the modulation scheme such as to adapt the system correctly to the channel conditions for more efficient operation in the analogous art of wireless communications.

21. Claims 6, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhuang (US 2003/0123381 A1) and in view of Kwan (US 2003/0081692 A1).

22. As per claim 6, Zhuang teaches claim 1. Zhuang does not teach *the transmitter is arranged to transmit a second signal to a receiver (Rx₁, Rx₂) of the at least first (s₁) and*

second signals (s'₂) in order to notify the receiver about the pre-coding of at least the first (s'₁) signal. However Kwan teaches *the transmitter is arranged to transmit a second signal to a receiver (Rx₁, Rx₂) of the at least first (s'₁) and second signals (s'₂) in order to notify the receiver about the pre-coding of at least the first (s'₁) signal* (Kwan, abstract, teaches that the optimized modulation and coding scheme (MCS) is communicated from a transmitter to a receiver in a wireless communications system.) Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement *the transmitter is arranged to transmit a second signal to a receiver (Rx₁, Rx₂) of the at least first (s'₁) and second signals (s'₂) in order to notify the receiver about the pre-coding of at least the first (s'₁) signal* of Kwan into Zhuang, since Zhuang suggest modifying the modulation scheme (something broad) in general and Kwan suggests the beneficial use of notifying the modulation change to the receiver such as to prepare the receiver for the new modulation scheme for more efficient operation in the analogous art of wireless communications.

23. As per claim 13, Zhuang teaches claim 8. Zhuang does not teach *the receiver is arranged to receive a second signal from the transmitter (Tx₁, Tx₂) in a response to the transmitter pre-coding at least the first (s'₁) signal.* However Kwan teaches *the receiver is arranged to receive a second signal from the transmitter (Tx₁, Tx₂) in a response to the transmitter pre-coding at least the first (s'₁) signal* (Kwan, abstract, teaches that the optimized modulation and coding scheme (MCS) is communicated from a transmitter to a receiver in a wireless communications system.) Thus it would have been obvious to

one of ordinary skill in the art at the time the invention was made to implement *the receiver is arranged to receive a second signal from the transmitter (Tx₁, Tx₂) in a response to the transmitter pre-coding at least the first (s'₁) signal of Kwan into Zhuang*, since Zhuang suggest modifying the modulation scheme (something broad) in general and Kwan suggests the beneficial use of notifying the modulation change to the receiver such as to prepare the receiver for the new modulation scheme for more efficient operation in the analogous art of wireless communications.

24. Claims 15, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhuang (US 2003/0123381 A1) and in view of Curriyan (US 2005/0141460 A9).

25. As per claim 15, Zhuang teaches claim 1. Zhuang does not teach a *transceiver*. However Curriyan teaches a *transceiver* (Curriyan, figure 7, teaches a transceiver which comprises a transmitter and a receiver). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a *transceiver* of Curriyan into Zhuang, since Zhuang teaches a transmitter and a receiver in general, and Curriyan suggests the beneficial use of a transceiver which combines a transmitter and a receiver such as to build a typical node in a communication system (Curriyan, figure 7 shows that a typical communication node is a transceiver) in the analogous art of telecommunications.

26. As per claim 16, Zhuang and Currihan teach claim 15. Zhuang also teaches a receiver (Rx_1, Rx_2) for simultaneously receiving at least a first (s'_1) and a second (s'_2) signal from a transmitter (Tx_1, Tx_2) (Zhuang, figure 8, elements 81 and 82 are receivers that receive the signals simultaneously transmitted in Zhuang, figure 2), the first received signal (s'_1) being modulated according to a first modulation constellation, the second received signal (s'_2) being modulated according to a second modulation constellation (Zhuang, figure 2, elements 23 and 24 show two separate modulators for the two signals to be received in figure 8), in which at least the first received signal (s'_1) is pre-coded through a modification of the first modulation constellation so as to prevent a correlation between the at least first (s'_1) and second (s'_2) simultaneously received signals (Zhuang, figure 2, elements 23 and 24 also show that, for the signals to be received in figure 8, the first modulation constellation is orthogonal to the second modulation constellation, i.e. modified to have a 90-degree phase shift to prevent correlation with the second signal).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THUAN NGUYEN whose telephone number is (571)270-7189. The examiner can normally be reached on 7:30 AM to 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pankaj Kumar can be reached on 571-272-3011. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

T.N.

/Robert W Wilson/
Primary Examiner, Art Unit 2419